

WHAT IS CLAIMED IS:

1. A rotary atomizer bell cup having a generally conical overflow surface between a radially inward central axial opening and a radially outward atomizing edge, the generally conical overflow surface having a generally constant flow angle relative to the atomizing edge.

2. The rotary atomizer bell cup of Claim 1 further including a deflector having a deflection surface of generally rotational symmetry disposed in front of said central opening, the overflow surface defining said generally constant flow angle relative to the axis from the deflector to the atomizing edge.

3. The rotary atomizer bell cup of Claim 2 wherein the overflow surface defines a generally constant flow angle relative to the axis from the central axial opening to the atomizing edge.

4. The rotary atomizer bell cup of Claim 2 wherein the deflector includes at least one inlet on the deflection surface, the deflection surface having a generally constant angle relative to the axis from the at least one inlet to a radially outer edge.

5. The rotary atomizer bell cup of Claim 2 wherein the flow angle is more than 60 degrees at all points between the deflector and the atomizing edge.

6. The rotary atomizer bell cup of Claim 2 wherein the deflector has a diameter less than 40% that of the atomizing edge.

5 7. The rotary atomizer bell cup of Claim 1 wherein paint flow along the overflow surface between the deflector and atomizing edge is substantially laminar.

8. The rotary atomizer bell cup of Claim 1 wherein paint atomized by said rotary atomizer has a deviation in particle size less than 50 microns.

10 9. A rotary atomizer having the bell cup as defined in Claim 1, the rotary atomizer rotating the bell cup about its axis and supplying paint to the bell cup through the central axial opening.

15 10. The rotary atomizer of Claim 1 further including shaping air ports supplying shaping air.

11. A rotary atomizer bell cup comprising:

a bell cup body including a generally conical overflow surface between a radially inward central axial opening and a radially outward atomizing edge;

5 a deflector having a deflection surface of generally rotational symmetry disposed in front of said central opening;

a rear cover secured to a rear surface of the bell cup body, a generally annular cavity formed between the rear cover and overflow surface.

10 12. The rotary atomizer bell cup of Claim 1 further comprising an annular hub extending rearwardly from the bell cup body, said rear cover secured to said annular hub.

13. The rotary atomizer bell cup of Claim 12 wherein said annular hub includes a threaded portion, said rear cover threaded onto said threaded portion of said annular hub.

15 14. The rotary atomizer bell cup of Claim 13 wherein said rear cover is welded or glued to the rear of the bell cup body behind the spray edge.

15. A paint spray zone for applying a particulate paint having particulates comprising:
a plurality of first paint sprayers each having a rotary atomizer, the first paint
sprayers atomizing a first coat of the particulate paint to a surface; and
a plurality of second paint sprayers each having a rotary atomizer, the second paint
5 sprayers atomizing a second coat of the particulate paint to said surface over
said first coat.

16. The paint spray zone of Claim 15 wherein the transfer efficiency of the paint spray
zone is greater than 75%.

10 17. The paint spray zone of Claim 15 wherein the first paint sprayers and second paint
sprayers are intermingled.

18. The paint spray zone of Claim 15 wherein said atomizers apply said particulate paint
15 to the surface and causes said particulates to lie flat on the surface.

19. The paint spray zone of Claim 15 wherein the atomizers atomize the particulate paint
into paint droplets having a paint droplet size deviation less than 50 microns.

20. A method for the rotary atomization of a particulate paint including the steps of:

- a) atomizing liquid paint having particulates into paint droplets having a paint droplet size deviation less than 50 microns; and
- b) adjusting paint spray parameters to ensure proper color matching.

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21. The method of Claim 20 wherein said step a) further includes the step of providing a substantially laminar flow of said paint across an overflow surface of a rotary atomizer bell cup.

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22. The method of Claim 21 wherein said step a) further includes the step of providing less than four flow deviations of said paint between an axial opening in a base of the bell cup and an atomizing edge of the bell cup, the overflow surface being between the axial opening and the atomizing edge.

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23. The method of Claim 22 wherein said step a) further includes the step of atomizing said paint into paint droplets having a size deviation of less than 30 microns.